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(54) TDMA VARIABLE SLOT ALLOCATION METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To quickly cope with fluctuation traffic from a mobile equipment by securing a fixed slot, securing a variable slot when a free slot is present in the variable slot, reporting a secured result to the mobile equipment and processing the data of both fixed and variable slots from the corresponding mobile equipment.

SOLUTION: The mobile equipment requests calling to a base station by using an incoming control channel, adds quality information requested by the mobile equipment to a calling request message and transmits it. The base station receives it, and when a calculated minimum required slot number (Ns) can be allocated from a free portion within one frame, allocates it to the mobile equipment as a fixed allocation slot. Also, from the maximum transmission speed of the quality information inside the calling message, a maximum slot number (Nr) used in one frame by the mobile equipment is calculated. In the case that the maximum slot number can be allocated by the free slots of the variable slots, (Nr-Ns) pieces of the slots are allocated to the mobile equipment as allocation changeable slots.

Partial English Translation of Ref. 2:

【0037】

Each mobile station determines the queue size in its transmission buffer in terms of frame units or prescribed frame number units. As seen from Fig.11, the transmission queue size (x) immediately after transmission of the "up"-control signal is added to the traffic quantity inputted in the very frame, and is subtracted or reduced by the traffic quantity corresponding to the slot number allotted to the mobile station, and the so determined transmission queue size is reported to the base station by using the "up"-channel of the subsequent frame. In response to the reports of the transmission queue sizes from a plurality of mobile stations the base station selects some mobile stations whose transmission queue sizes are beyond one threshold value (Xi) to increase the variable slot number to be allotted to each of the so selected mobile stations. Next, the base station finds out some other mobile stations whose queue sizes are below another threshold value (Xd) to determine how many slots are to be released from each of the so selected mobile stations. The base station uses the "down"-control channel of the frame (or the subsequent frame) to carry out the release of slots from the short-queued mobile stations and the allocation of available slots to the long-queued mobile stations. Upon receiving the acknowledgement signal from each long-queued mobile station the allotment is finished. The ACK/NACK signal may be multiplexed with the user data slot. As for the release of slots the slots will not be released as available before receiving the release-approval signal from the addressed mobile station. In other words, no slots can be allotted to other mobile stations before reaching the state of being released. This is the same with the case of management in terms of slot number.

【0038】

Referring to Fig.11, the manner in which the number of slots to be allotted is decreased or increased in the base station is described below: the base station uses the "up"-control channel to receive from each and every mobile station the report about its queue size (S0701). In case that the queue size from a selected mobile station increases beyond the threshold value (Xi), the slot number Nzp corresponding to the increment of the transmission queue size (x - Xi) is determined (S0703), and it is added to the variable slot number available for the selected mobile station (S0704). The subsequent proceeding (S0708) is similar to the transmission slot notice to the mobile station in each frame as shown in Practice Mode 2 (S0404 to S0415). In case that the queue size is below the threshold value (Xd), the slot number Nzm corresponding to the decrement of the transmission queue size (Xd - x) is determined (S0706), and it is subtracted from the variable slot number available for the mobile station. In case that variable slot numbers are given to mobile stations when permitted by the base station, the base station tries to select among the slots already allotted to the mobile stations, and take back releasable slots from them sequentially in the order of their larger allotments (S0707), and then, the base station uses the "down"-control channel to inform them of the results of retrieval (S0708). In case that use is made of the method of informing each mobile station of available slot number in each frame, the variable slot number is

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changed as follows: in the increasing case the processing at the calling receipt is used and in the decreasing case the processing at the calling cut-off is used.

【0039】

According to the present method the number of slots to be allotted to a selected mobile station can be increased or decreased to meet the queue size of the mobile station. Thus, the change of allotted slots in number can follow the instantaneous transmission queue only with the delay dependent on the queue report period from the mobile station. The slot allotment to each mobile station's traffic, therefore, can be performed with minimum delay.